INDEX TO VOLUME XVI.

* Illustrated articles. The weekly Departments are not indexed.

BOOK REVIEWS.

A Popular Treatise on the Electric Railway, by H. B. Prindle..... 50
A Treatise on Electro Metallurgy. W. G. Mac Millan..... 416
Congres International des Electriciens..... 66
Das Elektrische Licht, by Dr. A. R. von Urbanitsky..... 98
Dictionaire d'Electricité et de Magnetisme, by Julien Lefévre..... 82, 363
Electricity for Engineers, by Chas. Desmond... 66
Electricity in Daily Life..... 382
Electric Light Fitting, by J. W. Urquhart..... 114
Experimental Electricity, by Edward Trevert. 50
Handy Lists of Technical Literature. H. E. Haferkorn..... 432
Incandescent Electric Lighting, by L. H. Latimer, C. J. Field and W. B. Howell..... 312
Leçons sur L'Electricité, by Eric Gerard..... 136
Manuel Pratique de L'Installation de la Lumière Electrique, by J. P. Auney..... 336
Practical Dynamo-Building for Amateurs, by Frederick Walker..... 161
Practical Treatise on Injectors, by George N. Nissenson..... 196
Testimony taken before the Senate Committee on General Laws as to Electricity and Electric Lighting..... 312
Traite d'Electricité et de Magnetisme, by A. Vaschy..... 322

THE TELEGRAPH.

*Adjuster, Carr's automatic, for telegraph lines..... 56
African telegraphy, Amenities of..... 106
*Cable ship gear, Improvements in, by H. D. Wilkinson..... 25
Cable, The Bermuda-Halifax..... 27
Cable, The proposed Pacific..... 355
Cable to Australia, A..... 334
Dr. Norvin Green on the telegraph..... 386
*Dynamo plant of the Postal Telegraph Cable Company, Boston, Mass..... 313
Nationalizing the telegraph, by Erastus Wiman..... 417
*Submarine cables, On the form of, for long distance telephony, by W. H. Preece..... 244
Submarine cables, Probable explanation of a peculiar class of faults occurring in, by J. Parry Laws..... 455
Submarine cables, The capacity of, by Harold W. Ansell and Julian E. Young..... 456
Submarine telegraphy, Statistics of..... 334
*Suspended coil in cable work, by E. Raymond Baker..... 357
*Telegraph Lines, Carr's automatic adjuster for..... 56
Telegraph in China, The..... 226
*Telegraph sender, An automatic..... 82
Western Union Building (New York), Fire in the..... 50
Western Union fire (Edward Atkinson's views on)..... 68
Western Union Telegraph Company, Annual report of the..... 286
Western Union' quarterly statement..... 438
*Writing telegraph, The..... 247

TELEPHONE.

Bridging bells, by J. J. Carty..... 208
*Canadian Bell Telephone Company. New building of, at Hamilton, Ont..... 325
Central office apparatus, The housing and care of, by F. W. Patterson..... 203
Corporate organization, by E. J. Hall, Jr..... 203
Double cord keyboard, The operation of the, in Brooklyn, N. Y., by Geo. J. Davidson..... 201
Electric alarms and telephones applied to Texas fences..... 40
Medical examination by telephone..... 338
Metallic telephone circuits, Introducing..... 123
National Telephone Exchange Association (Detroit meeting), proceedings in full..... 201
Telephone exchange construction, Some general remarks on, by F. A. Pickernell..... 237
*Telephone exchanges, A registering system for..... 183
Telephone exchanges in Japan..... 594
Telephone and electric alarms applied to Texas fences..... 40
Telephones, Electric roads and (in England)..... 55
Telephone in Iceland..... 440
Telephone service, Extension and improvement of the..... 197
Telephone service, Inductive and earth interference with, by Dr. Louis Bell..... 189
Telephone suggested in 1855..... 360

ELECTRIC LIGHTING.

*Arc lamp, A new (Brush-Adams)..... 341
Grosvenor Galley central station..... 441
*Arc lamp, A new (Lundstedt's)..... 440
Artificial light of the future, Discussion of Prof. Nichols' paper on the..... 406
*Artificial light of the future, The, by Prof. Edward L. Nichols..... 387
Bangor's electric lights, by M. J. Francisco..... 38
Central station lighting as an investment, The, by B. E. Sunny..... 304
Central station, An electric light, The most favorable position for, by Dr. A. Foppl..... 421
*"Connecticut," Electrical appliances on the..... 66
Connellsville, Pa., Electric Light and Power Company's plant at..... 234
Co-operative electric light station, A British..... 69
Deptford station, A large casting for the..... 416
Domestic electric lighting, by W. A. Stadelman..... 57
Domestic lighting plant, Test of, by Ed. C. De Segundo..... 23
*Efficiency of a combined engine and dynamo. 255
*Electric headlight, A successful (Pyle's)..... 220
Electric lamp for mines, An..... 188
Electric light and power plant Springfield, Ill. 121
*Electric light and power station at Spokane Falls, Wash..... 181
Electric lights for divers..... 370
Electric lighting accessories, Notes on the differences between English and American, by Fred Bathurst..... 58
Electric lighting and transmission of power in Switzerland..... 390
Electric light in a theatrical performance, The..... 245
Electric lighting in Berlin, Growth of..... 52
Electric lighting in Japan..... 164
Electric lighting in the railroad service by M. B. Leonard..... 28
*Electric lighting on Staten Island..... 400
*Electric light station, A Montana (Livingston, Mont.)..... 169
Electric light stations, Value of detail in the care of, by A. J. De Camp..... 143
Electric light supply, The cheapest, in Europe 197
*Electric light plant at Uniontown, Pa..... 185
*Electric light plant in a New York Church.... 69
*Electric light of the Progress Club, New York City..... 83
*Electricity on Long Island Sound steamers... 66
Engines for electric lighting, High speed in, by Prof. R. H. Thurston..... 84
*Faults in electric light circuits, Note on localization of, by Edward Raymond Barker..... 416
*Gas Engines, Electric light plant operated by, at Woonsocket, R. I..... 23
Huntington search light on locomotives..... 319
*Huntington search lights on the "Connecticut"..... 66
*Imperial Hotel, Electric lighting at the..... 238
Incandescent lamps, Proper classification of the lighting power of, by Dr. Louis Bell..... 139
Incandescent lamps, Some long-lived..... 170
Installation in Berlin, Quick work on an..... 188
Isolated lighting, Cost of, by storage batteries 277
*Jenkintown, Pa., Electric light plant at..... 314
Lamps made at the Edison lamp work, Some special, by F. E. Jackson..... 231
Lighting Allegheny City..... 22
Lighting and traction in Italy..... 451
*Lighting of the "Plymouth"..... 382
Lighting plant at Allegheny City, Pa..... 450
*Lighting plant for the "Vesuvius"..... 375
Long life of some series incandescent lamps..... 221, 404
*Madison Square, Electrical illumination on 256
Moonlight tables, Frund's, August to January..... 50, 155, 218, 292, 382, 448
Municipal lighting, by M. J. Francisco..... 141
*Nova Scotia lighting station, A..... 283
*Plaza Hotel, Electric lighting of the..... 331
*Portable electric lamps for use in varnishing casks..... 27
*Progress Club, New York City, Electric light plant of the..... 83
Relations between manufacturing and central station companies, Report of committee on, to N. E. L. A..... 154
Series incandescent lamps, Life of..... 221, 404
*Signal lantern, Scott's flashing..... 188
*Springfield, Ill., Light and power station at.. 439
*Standard lamp, The Siemens-Violle..... 170
*Steamship lighting plant (on the "Seguransa")..... 116
*Tests of the Goolden-Willans combination... 405
*Transformer, Efficiency of the, by Calvin Humphrey and Wm. H. Powell..... 11
Transformers, Continuous current, in operation..... 160
*Transformers, Electrical distribution by, from central and eccentric stations, by Prof. J. A. Fleming, 58, 73, 85, 104, 122, 157, 170, 303, 315, 335, 351, 391, 402, 451
*Transformer, The Hedgehog..... 187
*Transformer, The Tesla..... 102
*"Vesuvius," Lighting plant for the..... 75

ELECTRIC RAILWAYS.

*Armature, The new Edison-Eickemeyer street railway..... 249
*Brill truck, A new..... 341
*Car starter, Flood's..... 102
*City and South London Railway..... 385
*Conduit, Closed electric railway (Van Depoele) 116
*Conduit for street railways, A closed (Harding's)..... 256
*Double trolley systems, Improvements in (Wheeler's)..... 24
Earliest electric railway, The..... 276
Edco storage battery street car, The, by D. H. Bates..... 296
*Edison-Eickemeyer street railway armature, The new..... 249
Efficiency test of the Third Ward Railway at Syracuse, N. Y., by G. D. Hulett..... 103
Electric motive power technically considered, by Wm. L. Allen..... 295
Electric motor to supersede the locomotive.. 439
Electric railway, A successful..... 250
Electric railways at Ft. Worth, Tex..... 184
*Electric railway construction, Details of (bracket and ratchet)..... 56
Electric railway construction, Some rapid work in (at Elmira, N. Y.)..... 247
Electric railway currents, Trouble from..... 116
Electric roads and telephones (in England)..... 55
Electric street railway motor, An, by John W. McNamara..... 228
*Electric traction, A new system of (river and rail)..... 54
Electric traction in Boston, Success of..... 371
*English electrical railway, An (Waller-Manville)..... 367
*Gearing for street car motors, Wooden toothed..... 74
*Greensburg, Pa., Westinghouse railway at... 321
Indianapolis electric street railway, The..... 246
*Insulator, A new curve (Sharpe's)..... 211
Lightning, A peculiar case of damage by, to street car motors..... 416
*Lineff electric tramway, The, by Gisbert Kapp..... 243
*Newark, N. J., Railway power plant at..... 417
Operation of electric railways, The..... 274
*Pole top, A street railway (Verstraete's)..... 70
*Power station, Albany street railway..... 164
Power station, A prominent Southern (Knoxville, Tenn.)..... 104
Rail bond, An all-copper..... 121
*Railway power station, Indianapolis..... 9
Reversing gear for street car motors (Baldwin's)..... 282
*Robinson's electric radial car..... 246
*Rochester street railway..... 433
*Running gear for electric cars..... 278
*Short electric railway motors, Construction of..... 280
*Short electric railway system at Rochester, N. Y..... 450
*Snow plow and sweeper, Thomson-Houston electric..... 248
Some features of the Sprague and Thomson-Houston systems of electric tramways, by Cary T. Hutchinson..... 312
*Springfield, Ill., Light and power station at.. 439
*Street railway appliances (Lieb's)..... 402
Steel vs. iron for electric street car wheels.... 370
Street railways, by Theodore P. Bailey..... 375
Storage battery traction, Improvements in, by Wm. Bracken, Jr..... 282
Street railway system, Minneapolis & St. Paul..... 21
*Switch, An overhead electric railway..... 88
Telpherage system at the Edinburgh exhibition..... 245
Telpherage patent, The United States..... 268
Tramway, A successful continental (Buda-Pestb)..... 86
Tramway, The electrical, in Paris..... 169
*Tripp electric railway truck, The new..... 282
*Trolley, An aluminium..... 366
*Trolley, A new underground (Reed's)..... 55
*Trolley arm, An improved (Baker's)..... 282
*Trolley base, A novel..... 370
*Trolley, The Boston..... 456
*Trolley wire switch, A new (Pierce Bros.)... 394
*Wenstrom electric railway system, The..... 293
*West End street railway, Central power station of..... 281
*Westinghouse electric railway at Lansing, Mich..... 197
*Westinghouse-Pullman electric car..... 294
*Westinghouse street railway motor..... 277

DYNAMOS.

*Coupling alternators in series, by Paul Boucherot..... 454
*Detroit Motor Company's new dynamo..... 438
*Dynamo, A new English..... 170
*Dynamo, An extraordinary (Elihu Thomson's) 68
Dynamo as a motor, The..... 168
*Dynamo-electric machines, Experiments on the best speed for, by M. Rechniewski..... 189
*Dynamos, Some new forms of, by F. L. O. Wadsworth..... 183
*Dynamo, The National incandescent..... 121
Dynamo, The new Thomson..... 82
*Electroplating dynamo, A new (National Electric Manufacturing Company's)..... 419
*Field magnets, Forging..... 21
*Kapp's central station dynamos..... 405
*Low speed multipolar dynamos and motors for continuous currents, by Frank A. Perret. 393
*Motor and dynamo, A new (Novelty Electrical Company's)..... 401
*Seafert dynamo and motor..... 421
*Stanley alternate current arc dynamo, Investigation of the, by W. B. Tobey and G. H. Walbridge..... 339
*Theory of compound winding for constant potential, by Dr. Louis Bell..... 383
*Water motor for small dynamos (Little Giant) 188

MOTORS AND THE TRANSMISSION OF POWER.

*Alternating current motors, Some new types of (Tesla's)..... 101
*Armature saving device (E. H. Johnson's)..... 36
*Crocker-Wheeler Motor Company, New factory of the..... 247
Drill, The Willait electric..... 247
Efficiency tests of motor and pump..... 182
*Electric drills at the Brooklyn Navy Yard ... 22
*Electric motors for elevators and hoisting apparatus..... 318
*Elevator, A new electric..... 437
*Elevators, Ongley's electric valve as applied to..... 68
*Electro-motor rates, A proper basis for determining, by H. L. Lufkin..... 144
*Eyer-Sheehan electric motor, The..... 227
*Induction motor, New Van Depoele..... 98
*Keystone motor..... 456
*Motor and ventilating fan, A combined (C. & C)..... 249
*Motor combined with a fog-bell..... 439
*Motor for window displays..... 422
*New-comer among motors, A (Novelty Company's)..... 338
*Otis electric elevator..... 3
*Perret multipolar motors..... 53
*Portelectric system, Experimental plant of the..... 275
Power required to do various kinds of machine work..... 28
*Pump, A domestic motor (Goulds' triplex).... 68
Pump and motor, Efficiency tests of..... 182
*Pump, The Goulds type of electric..... 122
*Seafert dynamo and motor..... 421
*Telpher system, An overhead..... 438
*Tesla's alternating current motors, Some new types of..... 101
Transmitting power, Cost of..... 52
*Van Depoele's induction motor..... 98
Water power and electric transmission..... 301

BATTERIES.

Accumulators left on open circuit, The discharge of, by Gaston Roux..... 371
*Battery, A diminutive and its applications.. 227
*Calculating storage battery plants..... 356
*Chemistry of secondary cells, Notes on the, by Prof. W. E. Ayrton..... 423
*Delany's battery strip..... 370
Dry batteries, A new compound for..... 210
*Gulcher thermo battery, Tests of the..... 320
Kousmine diffusion battery..... 38
*McLaughlin's secondary battery..... 249
*Reynier elastic accumulator..... 440
*Secondary cells, The working efficiency of, by Prof. Ayrton and others..... 89, 107, 124, 159
Storage battery as a current regulator..... 2
Storage batteries, Cost of isolated lighting by.. 277
*Storage cell for the phonograph..... 416
Sulphate of copper battery..... 390

METERS AND ELECTRICAL MEASUREMENT.

*Ammeter, A simplified (Bergmann's)..... 459
Edison electrolytic meter, The new Standard, by A. E. Kennelly..... 230
Edison meter, Conclusions drawn from one year's experience with the standard, by R. S. White..... 230
Electrical units, American names for..... 20
Electrical meters, by Robert Shand..... 368
*Electric meter, A simple (Thomson's pendulum)..... 66
*Measurement of current in lamp hours..... 2
*Measurement of low resistances, Accurate.... 58
*Meter, An electricity (Reckenzaun's)..... 281
*Pattee's lamp hour recorder..... 2
*Self-induction, The measurement of (Brew's method)..... 40
*Vetter testing set..... 438
*Walker ammeter and voltmeter, The..... 320

CONDUITS.

Electric conduits, Historical note on, by David Brooks..... 228
*Interior wire conduits..... 57
Liquid insulation for underground conductors, by David Brooks..... 135
Underground conductors, Liquid insulation for, by David Brooks..... 135
Underground conduits and conductors, Report of committee on, to the N. E. L. A..... 153
*Underground electric tubes, Edison System.. 6

MINING AND METAL WORKING.

*Aluminium reduction plant, An..... 294
*Arc welding (Coffin's system)..... 116
*Electric mining operations, Progress in, by R. M. Hazeltine..... 198
Electric power transmission in coal mines, by H. C. Spaulding..... 264
*Electric welding, A new method of (Coffin's incandescent)..... 196
Electric welding applied to the manufacture of projectiles, by Lieut. W. M. Wood..... 358
Electric welding, by Elihu Thomson..... 264
Electrolytic copper refinery, Working of an, by Dr. G. Gore..... 374
Iron ore, Magnetization of, by Clemens Jones.. 263
Lake Superior mining region, by F. DeLand... 71
*Magnetic separator, The Ball and Norton "Monarch"..... 265
*Mine installation, A model (Willock Mine, Pa) 115
Mining machinery, New (Bain's)..... 120
Ore dressing by electricity at the Tilly Foster Mine, by F. H. McDowell..... 263
Treatment of ores by the electrolytic method, by W. H. Fleming..... 5

ELECTRICAL EXHIBITIONS.

Edinburgh Exposition, Electrical section at the..... 30
Electrical exhibition at Minneapolis..... 98
Electrical exhibition on the Pacific Slope..... 88
Electrical industries and the World's Fair, by Prof. J. P. Barrett..... 134
Exposition of 1892 at Lyons, France..... 119
Pittsburgh Exposition, Electricity at the..... 248
*St. Louis Exposition, Some electrical features of the..... 186
St. Louis Exposition, The..... 300
World's Columbian Exposition..... 50
World's Fair, Electrical exhibit at the..... 458

EDUCATIONAL.

Education of electrical engineers, by Arthur T. Woods..... 292
*Electrical engineering at the College of New Jersey, by Wm. Elmer, Jr..... 51
*Electrical engineering at Cornell University. 346
*Electrical engineering at the Massachusetts Institute of Technology..... 218
Electricity in a high school (Newark, N. J.)... 50
Electricity of the public schools, by Albert Scheible..... 30
Schools of Electrotechnics, by George Black... 336

ASSOCIATION AND CONVENTION REPORTS.

American Association for the Advancement of Science, Electrical papers at the annual meeting, by Prof. A. F. Carman..... 164
American Institute of Electrical Engineers (meeting of Sept. 16)..... 218
American Institute of Electrical Engineers, December meeting of the..... 459
American Street Railway Association, Convention of (synopsis of proceedings)..... 292
American Street Railway Convention at Buffalo, N. Y., Proceedings in full..... 295
Association of Edison Illuminating Companies (programme)..... 165
Association of Edison Illuminating Companies (Minneapolis meeting), Report of proceedings..... 230
British Association, Electricity at the..... 196
Connecticut Electric Light Association, Annual meeting of..... 394
Electrical Society of Tokyo, Japan..... 5
National Electric Light Association Cape May meeting (announcement)..... 77
National Electric Light Association (Announcement of Providence meeting)..... 359

*National Electric Light Association, Cape May meeting, Proceedings in full.... 134
National Electric Light Association, Cape May convention notes.... 154
National Electric Light Association, Programme of the Cape May meeting.... 90
National Electric Light Association, Providence meeting (announcement).... 432
National Electric Light Association, Some prominent members of the.... 132, 155
National Electric Light Association, Cape May Meeting, Synopsis of proceedings and attendance.... 133
New York Electric Club, Dinner of the.... 256
Street Railway Association of the State of New York (Rochester meeting), Proceedings of the.... 228
Wisconsin Electric Club.... 422

SWITCHES, CUT-OUTS, ETC.

*Arc lamps, A hanger for (Forest City Electric Works).... 120
*Arc lamps, New connection for.... 2
Arc lamps, New suspension for.... 28
*Bracket, A new wall (Springfield).... 121
*Bradner adjustable lamp hanger.... 357
*Break-arm, Chubbuck's.... 211
*Brush-holder for dynamos, New carbon (Emmet's).... 338
*Carbon protector, The Hazeltine.... 357
*Coupling, New interior conduit.... 438
*Current protector, The Maxwell.... 106
*Cut-out, A new branch (Cutter's).... 27
*Cut-out, A useful safety.... 88
*Cut-out, New rosette (Bryant).... 121
*Electromagnetic protector (Sanford's).... 38
*Fuse block, Seymour's porcelain.... 438
Fuses, Alloys for.... 171
*Fuse terminals (McIntire's).... 69
*Hazeltine carbon protector, The.... 357
*Hill's new arc light cut-out.... 370
*Lamp hanger, The Bradner adjustable.... 357
*Lamp holder, An incandescent.... 187
*Lamp shade, A conical.... 106
*Lamp socket, A New (Hunt Engineering Co.'s).... 390
*Lamp socket rheostat.... 406
*Lamp support, Bassett combination.... 422
*Lightning arrester (Wood's).... 338
*Lightning arrester, Bain's hot wire.... 102
*Magazine fuse, A new.... 250
*Pendent block for incandescent lights (McCreary).... 122
*Protector and cut-out, Rich's double pole.... 171
*Protector for lamp sockets.... 456
*Reflector for electric chandelier.... 249
Switch, An ingenious snap (Hart's).... 187
Switch, A novel combination electric, by Lieut. Samuel Rodman.... 238
Switchboard plug.... 455
*Switch, Central station, for 3,000 amperes, (the Andrews).... 106
*Switch cut-out, The Ajax.... 122
*Switches, Double and treble pole "Ajax".... 286
*Switch for electric light fixtures (Bergmann).... 102
*Switch for incandescent circuits (The "Convention").... 106
*Switch, Stevens trolley wire.... 282
*Switch, The Electrix single pole.... 305
*Switch, The Perkins electric.... 246

LEGAL DECISIONS.

Decision in a patent infringement case: Leroy B. Firman and the Western Electric Company vs. the New Haven Clock Company.... 441
Decision in Pennsylvania, An important.... 338
Electric road is not a nuisance (La Fayette, Ind., decision).... 42
Faure secondary battery decision.... 87
Final fees in patent cases.... 435
Infringement suit: Electric Gas Lighting Company *vs.* Chas. E. Fuller.... 173
La Fayette, Ind.: Samuel Lonergan *vs.* The La Fayette Street Railway Company.... 42
Patent infringement, etc.: Holmes Burglar Alarm Telegraph Company *vs.* Domestic Telegraph and Telephone Company.... 43
Patent law (decision).... 43
Patent, The United States Telpherage.... 268
Telephone decision in Germany.... 250

MECHANICAL.

*Anti friction screw, A remarkable (Lieb's).... 319
*Automatic gear cutter.... 394
*Balanced valve for steam engines, A new (Freeman's).... 171
Belting, Webber's tests of, by Chas. A. Schieren. 211
*Commutators, Machine for turning (McLean's).... 227
Comparative tests of leather and canvas rubber, by Samuel Webber.... 114
*Drill for light work.... 406
*Dynamometer, The Trouve.... 39
Water heater and filter, Combined.... 394
*Friction cone plant (Hutchinson, Kan.).... 106
*Friction gear for driving dynamos, The Hamon.... 27
*Friction gearing in a central station (North Attleboro, Mass.).... 2
*Friction pulley, An improved.... 246
*Gas engines, Duplex, by Elmer A. Sperry.... 198
High speed in engines for electric lighting, by Prof. R. H. Thurston.... 84
*Ideal Compound Engine.... 421
Lubricating oils, Behavior of, by J. E. Denton.... 169
*Mabbs hydraulic packing.... 458
*Oil cups, Economical (Lunkenheimer's).... 321
*Ongley electric valve as applied to elevators.... 68
*Packing, A new (sensible automatic).... 122
*Packing for steam engines, An improved (Chesterton's).... 227
*Planimeter, A new.... 422
*Powell's grease cup for street car motors.... 394
*Running gear for electric cars.... 278
*Speed regulator, The Foote intermediate.... 305
Standards of economy in the generation of power, by H. N. Swetland.... 148
*Straight Line engine, The new compound.... 283
*Swain's metallic packing.... 394
Tests of a 500 horse power electric lighting engine.... 366
*Track and wheel brake, A compound (Wood's).... 404
Track brake, Trial of a new.... 280
Triple expansion engines, Performance of, by Ed. F. Williams.... 149
*Webster's vacuum exhaust steam economizer.... 187

MISCELLANEOUS.

A. B. C. store, Opening of the.... 266
*Alternate currents in parallel conductors of homogeneous or heterogeneous substances, by Sir Wm. Thomson.... 225
*Alternating current apparatus, Some experiments upon, by Harris J. Ryan.... 10
An anxious customer.... 409
*Anti-effective copper in parallel conductors or in coiled conductors for alternate currents, by Sir Wm. Thomson.... 224
Atmospheric electricity.... 226
*Battery rack, The Chamberlain.... 87
*Binding post, An insulated.... 338
*Block signal system, An audible (Desant's).... 39
Board of Electrical Control.... 422
Board of Electrical Control (meeting of Sept. 19.... 233
Boston, Inspection of electric wires in.... 356
*Burglar alarms, Circuit closer for (Bleakley's).... 266
*Cigar lighter, An electric.... 458
Civilian electrician in modern war, The, by Lieut. Bradley A. Fiske.... 322
Clambake at Providence, R. I.... 155
Common sense from Brooklyn.... 88
*Contact electricity, On an illustration of, presented by the Multicellular electrometer, by Sir Wm. Thomson.... 244
Cornell University notes.... 402
*Current distribution in networks of electrical conductors, by J. Herzog and L. Stark.... 118
*Current regulator, The storage battery as a.... 2
Dangers of electricity, by Prof. Henry Morton.... 136
Death by electricity, Further notes on the causes of, by Dr. Edward Tatum.... 36
Diamagnetism tested by Carnot's principle.... 160
Direct and alternating pressures on the human body, by J. Swinburne.... 221
*Door opener, "Positive" electric.... 422
*Earthquakes in connection with electric and magnetic phenomena, by John Milne.... 266
Economy in conductors in systems of distribution, by Hamilton Kilgour.... 457
Edison Company, Important changes in the.... 107
Electrical advances for the half year.... 448
*Electrical conductors, The application of the law of economy to, by Georges Santarelli.. 59, 75
Electrical energy, Where utilized, by H. Franklin Watts.... 21
Electrical oscillations, Experiments on.... 330
Electrical progress of 1890 as chronicled by THE ELECTRICAL WORLD.... 435
Electrical reception.... 402
Electrical stock market.... 395, 410, 426, 429, 442, 459
*Electric discharges, Motion of atoms in, by John Trowbridge.... 436
Electricity direct from coal, Edison on.... 371
*Electric motor factory, An (United Electric Traction Company).... 169
*Electric spark, Lightning and the, by Shelford Bidwell.... 41
Electric tanning, The history of.... 228
Electrodynamics of stationary bodies, by H. Hertz.... 210, 223, 285, 302, 334, 350
*The electromagnet, Cantor lectures, I., II., III. and IV., by Prof. S. P. Thompson, 155, 166, 222, 240, 258, 284, 3 1, 316, 336, 352, 372, 392, 407, 434
*Electromagnetic radiation, by Arthur L. Kimball.... 332, 348
*Electromedical apparatus, (Bailey's).... 57
Execution of Kemmler as seen by an electrician, by Chas. R. Huntley.... 100
*Execution of Kemmler by electricity.... 99
*Exhibit of the Brush Electric Light Company, of Baltimore, Md.... 371
Gas Commission, New York.... 2
*Gas fixture attachment A new.... 40
*Gas lighting by electricity, The Edwards system of.... 390
*Hall automatic block signal system.... 4
*Holiday electrical outfit.... 404
Huygens' gearing in illustration of the induction of electric currents, by Lord Rayleigh.. 56
*Induced magnetism, Molecular contributions to the theory of, by J. A. Ewing.... 241, 262
*Inductance and its proposed unit, the henry, by A. E. Kennelly.... 452
*Induction of electric currents, Huygens' gearing in illustration of the, by Lord Rayleigh.. 56
Inventors, A fine field for.... 121
*Insulator, A cable.... 422
*Insulator, A new lava (Steward's).... 187
*Insulator, Bain's break.... 458
*Insulator, Bain's glass.... 422
Insurance rules affecting electric light and power installations, A national code of, by W. J. Jenks.... 232
Insurance rules, Report of committee on, to the N. E. L. A.... 177
Iron filing curves, Method of fixing.... 40
Kemmler execution, A Westinghouse view of, by Paul D. Cravath.... 105
Kemmler execution, Mr. Edison on the.... 105
Latest foreign electrical news, 346, 366, 382, 400, 416, 432, 448
Lecture at the Electric Club, Prof. Nichol's.... 381
Legislation in Massachusetts.... 70
Legislation, Report of committee to the N. E. L. A.... 140
*Lightning and the electric spark, by Shelford Bidwell.... 41
Lightning flash, A destructive.... 42
Lightning flash, Quantity of electricity in a.. 40
Lightning, Infrequency of deaths by.... 28
*Magnetic properties of alloys of nickel and iron, by J. Hopkinson.... 172
*Magnetism and recalescence, by J. Hopkinson.... 435
*Mercury, Recent determination of the absolute resistance of, by R. F. Glazebrook.... 261
*Microphone, The evolution of the, by A. M. Tanner.... 419
Observations of a constructing electrical engineer, by C. E. Woods.... 431
*Okonite Company, Passaic shops of the.... 120
Ornamenting brasswork.... 281
*Porter electric messenger system, The.... 440
*Portrait: XV.—Nichols, Edward L.... 20
*Portrait: XVI.—Houston, Edwin J.... 180
*Portrait: XVII.—Prof John Ambrose Fleming.... 339
*Portrait: XVIII.—John P. Barrett.... 400
*Portrait: XIX.—Prof W. E. Ayrton.... 432
*Polyphone, The Zigang.... 88
Preservation of fermented liquids by electricity.... 28
*Push button, A combination.... 49
*Push button, An improved (Armstrong's).... 266
Quantity of electricity in a lightning flash.... 40
Remarkably successful joke.... 82
Report of the Commissioner of Patents.... 314
*Resistance coils and boxes; their construction and use, by Chas. P. Frey.... 436, 455
Seattle, Wash., Electrical progress in.... 355
Seeing by electricity.... 26
Sparks from belts.... 72
Spectro-lantern, The.... 265
Standard wire resistance (report of American Institute Committee).... 408
*Stenotelegraph, The Cassagnes, by L. Chenut 37
*Telecall system.... 321
*Testing iron, by J. Swinburne and W. F. Bourne.... 225
Testing station, An electrical.... 58
Thermo chemistry in relation to electromotive force, by Prof. J. E. Siebel.... 20
Thermo-magnetic apparatus.... 40
Torpedo boat, The Sims-Edison (Trial of).... 52
Vermilion, Manufacture of, by Electrolysis.... 160
Vibrations of an incandescent platinum wire.. 394
Wade, Mr. J. H., Death of.... 107
*Watch demagnetizer, A cheap.... 390
Window beautiful, The.... 442

AUTHORS.

Allen, Wm. L.... 295
Ansell, Harold W.... 456
Ayrton, W. E.... 89, 107, 124, 159, 423
Bailey, Theodore P.... 375
Ball, C. M.... 265
Barker, Edward Raymond.... 416
Bates, D. H.... 296
Bathurst, Fred.... 58
Barker, E. Raymond.... 357
Barrett, J. P.... 134
Bell, Louis.... 139, 180, 382
Bidwell, Shelford.... 41
Black, George.... 330
Boucherot, Paul.... 454
Bourne, W. F.... 225
Bracken, Wm. Jr.... 282
Brooks, David.... 175, 228
Carman, A. P.... 164
Carty, J. J.... 208
Chenut, L.... 37
Cravath, Paul D.... 105
Davidson, Geo. J.... 201
DeCamp, A. J.... 143
DeLand, Fred.... 71
Denton, J. E.... 169
De Segundo, Ed. C.... 23
Edison, T. A.... 105
Elmer, William, Jr.... 51
Ewing, J. A.... 241, 262
Fiske, Bradley A.... 322
Fleming, J. A., 58, 73, 85, 104, 122, 157, 170, 303, 315, 335, 351, 391, 402, 451
Fleming, W. H.... 5
Foppl, A.... 421
Francisco, M. J.... 38, 141
Frey, Chas. P.... 436, 455
Glazebrook, R. T.... 261
Gore, Dr. G.... 374
Green, Dr. Norvin.... 386
Hall, E. J., Jr.... 203
Hazeltine, H. M.... 198
Hertz, H.... 210, 223, 285, 302, 334, 350
Herzog, J.... 118
Hopkinson, J.... 172, 435
Hulett, G. D.... 103
Humphrey, Calvin.... 11
Huntley, Chas. R.... 100
Hutchinson, Cary T.... 312
Jackson, F. E.... 231
Jenks, W. J.... 232
Jones, Clemens.... 263
Kapp, Gisbert.... 243
Kennelly, A. E.... 230 452
Kilgour, Hamilton.... 457
Kimball, Arthur L.... 332, 348
Laws, J. Parry.... 455
Leonard, M. B.... 28
Lufkin, H. L.... 144
McNamara, John W.... 228
Milne, John.... 266
Morton, Henry.... 136
McDowell, F. H.... 263
Nichols, Prof. Edward L.... 387
Patterson, F. W.... 206
Pickernell, F. A.... 207
Powell, Wm. H.... 11
Preece, W. H.... 244
Rayleigh, Lord.... 56
Rechniewski, M.... 189
Rodman, Samuel.... 238
Roux, Gaston.... 371
Ryan, Harris J.... 10
Santarelli, Georges.... 59, 75
Scheible, Albert.... 36
Schieren, Chas. A.... 211
Shand, Robert.... 398
Siebel, J. E.... 20
Spaulding, H. C.... 264
Sperry, Elmer A.... 198
Stark, L.... 118
Sunny, B. E.... 304
Swetland, H. N.... 148
Swinburne, J.... 221, 225
Tanner, A. M.... 419
Tatum, Dr. Edward.... 36
Thomson, Elihu.... 264
Thomson, Sir Wm.... 224, 225, 244
Thompson, Silvanus P., 155, 166, 222, 240, 258, 284, 301, 316, 336, 352, 372, 392, 407, 434
Thurston, R. H.... 84
Tobey, W. B.... 339
Trowbridge, John.... 436
Wadsworth, F. L. O.... 183
Walbridge, G. H.... 339
Watts, H. Franklin.... 21
Webber, Samuel.... 114
White, R. S.... 230
Wilkinson, H. D.... 25
Williams, Ed. F.... 149
Wiman, Erastus.... 417
Wood, Lieut. W. M.... 358
Woods, C. E.... 432
Young, Julian E.... 456